

***The Skyscraper Safety Campaign  
Subcommittee on Building & Fire Codes  
www.SkyscraperSafety.org***

*Comments on NIST's Analysis of Building and Fire Code Practices (Project 1) in the June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster, NIST Special Publication 1000-5*

**PREMISE – Project Objective:**

The premise of Project 1 is, we believe, seriously flawed because there is no commitment to ascertain the impact of the immunity from New York Department of Buildings jurisdiction of the three buildings concerned, as regards applicable building, fire and life safety codes of the day. Avoidance of the issue in terms of conformity to the relevant codes was reiterated by NIST in June 2004 at the Federal Advisory meeting when it was stated publicly that NIST was not a code-conformity body and would make no judgment on the code compliance of the buildings. The fact that NIST then stated that they might “perhaps” make an exception for “major” issues like the thickness of fireproofing in the Twin Towers only seems to emphasize how crucial the analysis and recommendations on code compliance are to the credibility of this investigation.

We believe that this is about much more than simple conformity to codes. The legal immunity of these buildings meant that unorthodoxy in design, testing and practice became the norm in these buildings – even before designs were submitted to New York City for comment or before conformity to fire codes became a major issue with the Fire Department from 1975 onward. In effect, code compliance was “designed out” at an early stage compounding the problems of making safety upgrades throughout the life of the buildings. The unorthodoxy had reverberating effects: – bar joist floors are notoriously difficult to fire-proof, which is one reason they are not permitted as primary members in floors assemblies. With no external authority having jurisdiction over these buildings, the PA was not required to submit basic tests, calculations and research for outside examination. We now see evidence of deficiencies, inadequacies, and as stated by the NIST Investigation, complete absence of fire testing on the WTC floor assemblies - testing which would have been mandatory in any building in NYC which was not immune from code compliance!

**WHY THIS IS IMPORTANT:**

1. The Port Authority of NY & NJ (PA) has always proclaimed to the press and public that the World Trade Center buildings “met and exceeded code.” In written documents this emphatic statement is sometimes qualified with “wherever possible.” The PA’s inability to produce a fire test demonstrating a two or three

hour fire rating for their bar joist floor assembly in the Twin Towers or point to any such test listed in the industry in the late 1960s (in for instance, UL's Fire Resistance Directory), make the PA's claim to code conformity on such crucial issues palpable nonsense. A PA letter of October 30 1969 to the fire-proofing contractor makes it patently clear that the PA felt the need to conform to code but was incapable of carrying out the relevant tests or calculations unsupervised or unmonitored.

2. Members of the public and the emergency services, in particular firefighters, depend crucially on the minimum construction and fire resistance standards of the state and municipal codes for their safety and indeed, in emergencies, for their lives. Conformity to code is indeed the basis on which emergency personnel operate and, as in the case of New York City Fire Department, develop their standard operation procedures (SOPs) for emergency operations in the city.

3. Much in this investigation stems from this question: Had the buildings had to conform to code, or more importantly had jurisdiction for interpretation of conformity resided with NYC's Department of Buildings (NYDOB), as was the practice for other buildings, would there have been crucial differences in design? Indeed, given the unorthodox nature of their design and structure, would the Twin Towers have been built, or at the very least built as they were, at all. This has nothing to do with whether conformity to code had any bearing on the collapse of the buildings – that is a crucial but separate issue.

4. Immunity from codes is about much more than compliance or non-compliance. It is about a second, third and fourth pair of eyes, about different disciplines -- structural engineers, fire protection engineers and egress experts -- examining design and construction, making critical appraisals, removing the inherent conflict of interest when a developer is the designer and is the inspector as well. It is also about not "designing conformity to code out" at the design/architectural stage so that if new threats or issues arise, the building can never be made compliant.

5. We are living in a new age. Terrorists are seeking out buildings with specific weaknesses – in structural design, in fireproofing, in egress capacity. As a number of experts have said privately, there is little real doubt that this is what happened at the World Trade Center. The research and planning by people with specialist engineering, construction, demolition and high-rise building knowledge that went into the destruction of these buildings was prodigious. At a time when building code groups, owners, developers and even the government are considering specific anti-terrorism measures for buildings, we should be asking ourselves if there should be any federal government exemption from code or code enforcement jurisdiction, for any buildings, especially when federal government buildings are inevitably the most obvious terrorist targets.

## METHODOLOGY:

It is difficult to deduce a systemic methodology within the Progress Report on Project 1, even within the constraints of the tasks and objectives listed by NIST. There is no logical thread of investigation here. All too often when something has been discovered it is not pursued – even if that line of inquiry meets the requirements of the tasks NIST has set for itself. Although we recognize that this draft is an ongoing process, certain trends are obvious. In particular, since one of the key objectives of this investigation is to make recommendations, it unclear on this project at least, what recommendations NIST is working towards; where it believes the central issues or “lessons learned” might lie. What facts is NIST trying to discover in terms of what recommendations might be at issue here? In particular, when the paper trail goes cold there seems to be no recourse to the obvious substitutes: interviews with individuals, secondary sources etc. These might fill vital gaps in the picture portrayed here, giving the overall project chapter a more cohesive, narrative structure – something the progress report lacks.

## CONTENT:

The absence of any real analysis of conformity to code and the issue of jurisdiction is all the more startling reading the content of the progress report on Project 1 (pages 48-72, Volume 1).

1. The first thing that is clear is that the PA placed great emphasis on adherence to the New York City Building Codes. As NIST notes on Page 52: “The Port Authority adopted the 1968 NYC Building Code (NYCBC 1968) for the final design of the WTC buildings.” The rapidity with which the Port Authority took advantage of the “less restrictive provisions of the 1968 Code” and the October 30, 1969 letter to the fire-proofing contractor all demonstrates that the codes were the PA’s guiding light. Surely then, shouldn’t codes, jurisdiction and the PA interpretation of the codes in the context of prevailing interpretative code practice in New York, be the starting and ending point here?

2. We see the inherent contradiction of an agency claiming conformity to code, yet acting as its own arbiter of that same conformity. The draft report notes on several occasions in several ways that the many unorthodox features in these buildings were features that to a large extent made the codes irrelevant. While bar joist floors spanning up to 60 feet in high rise buildings were not specifically prohibited by the NY codes of 1938 or 1968 - however, code practice for buildings under the jurisdiction of the NYC Department of Buildings did not allow them -- then or now.

As all practicing structural engineers, architects and fire protection engineers know, code conformity is the interpretation of the authority having jurisdiction – a blend of interpretation of the written code, prevailing engineering practice, local experience/conditions etc. The ambiguities in codes, the potential for differences in interpretation, the fact that prevailing practice is as much a part of code

enforcement as the written text, all make it obvious why there can only be one authority for code interpretation and enforcement. If the developer can make his own code interpretation, particularly while engaged in such innovative/unorthodox construction, the key public protective purpose of the codes and the agency interpreting them is lost.

3. Context. The above is just one example of a complete lack of relevant context here. While NIST has looked in some detail at comparative codes of the time for other cities with a major high-rise industry, Chicago for example - there is no detailed examination of contemporary practice in New York. Codes, prescriptive or performance related, are not just written documents – they are contemporary practice as defined in this case by NYCDOB. Bar joist floors in high-rises, were for instance, absolutely off limits in New York at the time. Other developers who approached the New York authorities about the possibility of using them when it became known the PA was using them in the Twin Towers - were reproached for even raising the question.

The use of bar joist floors actually made the code somewhat irrelevant – as the structural frame issue that NIST has looked at makes clear. Since the code never envisioned the use of bar joist floors, the issue of whether the floor assemblies were effectively primary members that would require fireproofing to the same resistance as the columns never arose in the code! And this issue of fire testing of these members was certainly not addressed or apparently even considered by the PA or its contracted engineers/architects. Bar joists floors and their connections also raised the question as to whether such floors, such small, light members were in fact “fire-proofable” at all to the requisite standard, by means of spray-on insulation. These are just some examples of the way in which fundamental design decisions had ripple effect consequences that became major safety issues.

4. Some Specifics: To comment further on the progress report on Project 1, the second point on page 70, entitled “The review of design documents by the Department of Buildings of NYC” and point number 5 on the following page, “Deviations from the NYC Building Code,” beg many questions. Why, on the latter, does NIST list only one of the deviations? It is not clear if this is the only one mentioned in the letter. If so what efforts have been made to discover the other deviations noted. On the former, some analysis on the nature and “level” of the review is essential as NIST suggests. If the documentation cannot be located, individuals like Joe Solomon and Douglas Fernandez of Emery Roth & Sons and those working in the NYCDOB at the time need to be traced and interviewed.

5. Fire Department. On page 58, in reference to code compliance and jurisdiction, the Progress Report states: “It appears that there was friction between the FDNY and the Port Authority.....” Our own interviews and some acquired documentation demonstrate that NIST’s statement is to say the least an understatement. In fact, successive fire chiefs, commissioners and officers below

them, grappled with the PA over basic safety issues and code compliance for years. It is essential that at the very least NIST examine the “voluminous WTC files maintained at the Fire Department” the draft report mentions and summarize the concerns and consequences. Nothing will better demonstrate the essential problem of powerlessness of a Fire Department, which along with the NYCDOB, had no jurisdiction over the buildings – no authority to even inspect the buildings, initially, let alone enforce the fire code – yet was ultimately responsible for the lives of the occupants and their own men in case of fire. One of NIST’s own consultants, Chief Vincent Dunn, is an articulate guide to this narrative of code compliance and legal jurisdiction issues.

#### RECOMMENDATIONS:

1. There must be more specificity – the sources NIST cites should be quoted by date, title and authorship. Such documents should also be published
2. Interviews are essential. In many cases NIST has no documentary evidence – documents, plans, letters memos have been disposed off or were destroyed in the 9/11 attacks.
3. There should be a renewed focus on answering key questions

#### CONCLUSION:

NIST’s preliminary findings in this chapter demonstrate the centrality of codes, code immunity, prevailing contemporary practice and jurisdictional immunity to this investigation. However, currently one has to literally read between the lines and connect some very widely-spaced dots to deduce this. The failure to pursue specific lines of inquiry, especially by means other than documentation, the failure to analyze the contemporary prevailing practice of codes and design in New York, the failure to fully document the authorities and others’ concerns about the design, construct and maintenance of these buildings, deprive the reader of the full, focused picture.

There is a lot of information in this progress report on Project One. How it links into a coherent whole, how it interlinks with the other projects, how it moves towards answering even the questions NIST has set for itself, remains to be seen. That there are other issues outlined here in this critique that we believe NIST should be seeking to answer, is an additional matter. It is difficult to see how the issue of federal immunity for building, fire and life safety codes and what that means in practice cannot be at the center of considerations for recommendations that NIST will make. Whether those legal immunities – and above all the lack of power they give local and state authorities to require changes on grounds of safety or security – cost lives in the World Trade Center disaster is, while not irrelevant, not the sole consideration. The paramount consideration should be that post 9-11, all new building construction should be examples of the highest standards of safety, quality, and security and must be under the legal jurisdiction of local codes for the safety of the public. No building should be above the law, including the new World Trade Center in NYC.